Claims

1. A noble metal catalyst for hydrocarbon conversion comprising a group VIII metal selected from platinum, palladium, ruthenium, rhodium, iridium, or mixtures of combinations thereof on a support, **characterized in that** the catalyst activates carbon monoxide at a temperature below 323 K.

2. A noble metal catalyst according to claim 1, **characterized in that** the group VIII metal is platinum.

3. A noble metal catalyst according to claim 1 or 2, **characterized in that** the support is selected from zeolites, inorganic oxides, carbon related materials and mixtures and combinations thereof.

4. A noble metal catalyst according to claim 3, **characterized in that** the zeolite is selected from medium and large pore zeolites having acid sites, preferably from large pore zeolites having weak or medium strength of acid sites.

5. A noble metal catalyst according to claims 3 or 4, **characterized in that** the zeolite is selected from mesoporous aluminosilicates, crystalline aluminosilicates, crystalline aluminophosphates and crystalline aluminosilico-phosphates.

6. A noble metal catalyst according to any one of claims 3 - 5, **characterized in** that the zeolite is selected from MCM-41, Y- and beta-zeolites, mordenites, AlPO-5 and AlPO-11, SAPO-5 and SAPO-11.

7. A noble metal catalyst according to claim 3, **characterized in that** the inorganic oxide is selected from silicon oxide, aluminum oxide, titanium oxide, zirconium oxide, tungsten oxide and magnesium oxide, preferably from silicon oxide and aluminum oxide.

8. A noble metal catalyst according to claim 3, **characterized in that** the carbon related material is selected from activated carbon, graphite and carbon nanotubes.

9. A noble metal catalyst according to any one of claims 1 - 8, **characterized in that** the catalyst activates carbon monoxide at temperature below 323 K, as determined by analysing carbon monoxide by IR and mass spectrum.

10. A noble metal catalyst according to claim 9, **characterized in that** the group VIII metal is platinum and the zeolite is MCM-41.

11. A method for the manufacture of a noble metal catalyst for hydrocarbon conversion, **characterized in that** the method comprises the following steps:

a) Pre-treatment of the support at a temperature between 423 – 1173 K and optional modification of the support;
b) Deposition of the noble metal by gas phase deposition technique comprising vaporisation of the noble metal precursor and reaction with the support, and
c) Final handling, yielding a catalyst activating carbon monoxide at temperature below 323 K.

12. A method for the manufacture of a noble metal catalyst for hydrocarbon conversion according to claim 11, **characterized in that that** the noble metal is selected from platinum, palladium, ruthenium, rhodium, iridium, or mixtures of combinations thereof.

13. A method according to claim 11 or 12, **characterized in that** the noble metal is platinum.

14. A method according to any one of claims 11 - 13, **characterized in that** the support is selected from zeolites, inorganic oxides, carbon related materials and mixtures and combinations thereof.

15. A method according to claim 14, **characterized in that** the zeolite is selected from medium and large pore zeolites having acid sites, preferably from large pore zeolites having weak or medium strength of acid sites.

16. A method according to claim 14 or 15, **characterized in that** the zeolite is selected from mesoporous aluminosilicates, crystalline aluminosilicates, crystalline aluminophosphates and crystalline aluminosilico-phosphates.

17. A method according to any one of claims 14 - 16, **characterized in that** the zeolite is selected from MCM-41, Y- and beta-zeolites, mordenites, AlPO-5 and AlPO-11, SAPO-5 and SAPO-11.

18. A method according to claim 14, **characterized in that** the inorganic oxide is selected from silicon oxide, aluminum oxide, titanium oxide, zirconium oxide, tungsten oxide and magnesium oxide, preferably from silicon oxide and aluminum oxide.

19. A method according to claim 14, **characterized in that** the carbon related material is selected from activated carbon, graphite and carbon nanotubes.

20. A method according to any one of claims 11 - 19, **characterized in that** the metal precursor is a volatile metal compound.

21. A method according to any one of claims 11 - 20, **characterized in that** the metal precursor is selected from metal chlorides, oxychlorides, β-diketonates, metallocenes and oxides.

22. A method according to any one of claims 11 - 21, **characterized in that** the metal precursor is $(CH_3)_3(CH_3C_5H_4)Pt$.

23. A method according to any one of claims 11 - 22, **characterized in that** in the first process step the support is pre-treated at a temperature of 423–1173 K, and in the second step the deposition is carried out in the presence of an inert carrier gas.

24. A method according to claim 23, **characterized in that** the inert carrier gas is nitrogen, helium, argon or methane.

25. A method according to any one of claims 11 - 24, **characterized in that** the optional modification in the first step is carried out by blocking part of the available surface sites on the support with a blocking agent selected from alcohols, acetylacetone, 2,2,6,6-tetramethyl-3,5-heptanedione, precursors of silicon oxide, aluminum oxide, titanium oxide, zirconium oxide, tungsten oxide and magnesium oxide, and nitrates.

26. A method according to claim 25, **characterized in that** the precursors is silicon tetrachloride, tetramethoxysilane, tetraethoxysilane, hexamethyldisilazane, hexamethyldisiloxane, aluminum chloride, aluminum ethoxide, aluminum (III) acetylacetonate, tris(2,2,6,6,-tetramethyl-3,5-heptanedionato)aluminum, trimethylaluminum, triethylaluminum, titanium tetrachloride, titanium isopropoxide, zirconium tetrachloride, tungsten oxychloride, tungsten hexachloride and tris(2,2,6,6-tetramethyl-3,5-heptanedionato)-magnesium.

27. The use of the noble metal catalyst according to any one of claims 1 – 10 or manufactured according to the method of any one of claims 11 – 26 in ring-opening, isomerisation, alkylation, hydrocarbon reforming, dry reforming, hydrogenation and dehydrogenation reactions, and preferably in ring-opening of naphthenic molecules.

28. A process for the manufacture of middle distillate diesel fuel, **characterized in that** a middle distillate feedstock is transferred to a reactor wherein it is allowed to react at a temperature of 283 - 673 K and under a pressure of 10 – 200 bar with hydrogen in the presence of a noble metal catalyst according to any one of claims 1 – 10 or manufactured according to the method of any one of claims 11 – 26 to accomplish opening of naphthenes with two and multiple rings to produce isoparaffins, n-paraffins and mononaphthenes in the middle distillate region.